



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/699,456	10/31/2003	David Champion	100200584-1	9588

22879 7590 11/10/2008  
HEWLETT PACKARD COMPANY  
P O BOX 272400, 3404 E. HARMONY ROAD  
INTELLECTUAL PROPERTY ADMINISTRATION  
FORT COLLINS, CO 80527-2400

EXAMINER
----------

ONEILL, KARIE AMBER

ART UNIT	PAPER NUMBER
----------	--------------

1795

NOTIFICATION DATE	DELIVERY MODE
-------------------	---------------

11/10/2008

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

JERRY.SHORMA@HP.COM  
mkraft@hp.com  
ipa.mail@hp.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/699,456	<b>Applicant(s)</b> CHAMPION ET AL.	
	<b>Examiner</b> Karie O'Neill	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 28 July 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20, 48, 49 and 68-72 is/are pending in the application.
- 4a) Of the above claim(s) 5 and 7-11 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6, 12-20, 48, 49, 68-72 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

1. The Applicant's amendment filed on July 28, 2008, was received. Claims 1, 48 and 49 have been amended. Claims 21-47 and 50-67 have been cancelled. Claims 5 and 7-11 have been withdrawn from consideration. Claim 72 has been added as new. Therefore, Claims 1-4, 6, 12-20, 48, 49 and 68-72 are pending in this office action.
2. The text of those sections of Title 35, U.S.C. code not included in this action can be found in the prior Office Action issued on April 28, 2008. The claims are being examined in light of the rejections under 35 U.S.C. 112.

### ***Examiner's Note***

3. The interpretation of the Election/Restriction of the Office Action dated April 28, 2008, as noted on page 7 of the Remarks dated July 28, 2008, is correct.

### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:  

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
5. Claims 1-4, 6, 12-20, 48, 49, and 68-72 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The limitation, "including insoluble matter of a liquid," is unclear because there is no indication of what type of liquid is being used to provide the "insoluble matter" or

Art Unit: 1795

when/where/how the liquid is being used in this product. Materials are inherently soluble or insoluble in a variety of different solvents.

6. The term "insoluble matter" in claims 1, 48 and 49 is a relative term which renders the claim indefinite. The term "insoluble matter" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Materials are inherently soluble or insoluble in a variety of different solvents.

7. Claims 1, 48 and 49 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are: the process or steps in which the liquid is washed away with nanowires, leaving insoluble matter and nanowires exposed for further processing. See Applicant's the specification on page 7. It is not clear from the claim or disclosure what is included in the identity of the final product.

### ***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Art Unit: 1795

9. Claims 1-4, 6, 12-13, 15-20, 48, 49 and 68-71 are rejected under 35 U.S.C. 102(b) as being anticipated by Seabaugh et al. (US 2003/0027033 A1).

With regard to Claims 1-3, 20, 48, 49 and 71, Seabaugh et al. discloses a solid oxide fuel cell in which power is generated by the transport of ions through an electrolyte membrane sandwiched between electrodes (paragraph 0003). The electrolyte acts as a substrate for a ceramic electrode, the ceramic electrode comprising a mixture of two or more components including at least one nano-scale ionically conducting ceramic electrolyte material and at least one nano-scale powder of an electrode material (paragraph 0002). The inherently patterned electrode/electrolyte material mixture is established on either side of the electrolyte material when forming the fuel cell. The inherently patterned electrode/electrolyte material mixture is made up of the mixture of electrolyte nanoparticles and electrode material nanoparticles being mixed together with a liquid surfactant material that will surround and contain the powdered mixture has a plurality of nanoparticles dispersed therein, and at least one of the plurality of nanoparticles contacting at least an other of the plurality of nanowires; wherein the plurality of nanoparticles enhances catalytic activity of the inherently patterned electrode as the oxygen molecules from air are converted to oxygen ions at the air electrode and these oxygen ions react with hydrogen and carbon monoxide to form water and carbon dioxide at the fuel electrode (see paragraphs 0003-0004 and Claims 1-25). Seabaugh et al. also discloses wherein the fuel cell is device for generating power which is supplied to external devices or a load.

Art Unit: 1795

With regard to Claim 4, Seabaugh et al. discloses wherein the electrolyte is at least one of yttrium-stabilized zirconia, gadolinium-doped ceria, a doped ceria electrolyte material, barium zirconate, scandium doped zirconia, a lanthanum gallate based ceramic electrolyte material, a bismuth oxide based electrolyte materials (paragraph 0051). Gadolinium-doped ceria is formed as a single phase with a cubic fluorite structure as is evidenced by Godinho in Influence of Microwave Heating on the Growth of Gadolinium-Doped Cerium Oxide Nanorods on page 384.

With regard to Claim 6, Seabaugh et al. discloses wherein the plurality of nanowires is formed from electrolyte filament materials (paragraphs 0043-0044).

With regard to Claims 12-15, the inherently patterned film comprises a cathode, wherein the plurality of nanoparticles comprises metallic components of cathode material (paragraph 0045), and wherein the nanoparticles are randomly oriented throughout the electrode material.

With regard to Claims 16-19, Seabaugh et al. discloses wherein the nano-scale electrolyte materials and the nano-scale electrode powder materials are less than 100nm in dimension (paragraph 0009).

With regard to Claim 68, Seabaugh et al. discloses that the ceramic electrode material formed by mixing at least one nano-scale ionically conductive ceramic electrolyte material and at least one nano-scale powder of an electrode material, are useful in fuel cells. It is the position of the examiner that the fuel cell of Seabaugh et al. and the instant application have the same structural features and the ceramic electrode material can be used in the same type of fuel cell. Applicant is advised to submit other

Art Unit: 1795

information in regard to a single chamber fuel cell if it is shown to be patentably distinct to the invention.

With regard to Claims 69 and 70, Seabaugh et al. discloses wherein a nanoscale powder of electrolyte material and a powder of an electrode (cathode or anode) material are mixed (paragraph 0043).

10. Claims 1-3, 6, 12-16, 18-20, 48, 49 and 68-71 are rejected under 35 U.S.C. 102(b) as being anticipated by Huang et al. (US 2002/0098406 A1).

With regard to Claims 1-3, 20, 48, 49 and 71, Huang et al. discloses a solid oxide fuel cell for automotive and other applications (paragraph 0008), comprising: a substrate made of an electrolyte (Example 1); an inherently patterned paste made up of a plurality of well-dispersed nano-sized particles of electrocatalytic noble metals and ceramic ionic conducting particles mixed with a suitable binder and a suitable solvent, the plurality of well-dispersed nano-sized particles established on the electrolyte substrate and increasing the number of sites which enhance catalytic activity (paragraphs 0020-0023, 0043).

With regard to Claim 6, Huang et al. discloses wherein plurality of nano-sized particles is formed from a ceramic ionic conductor made from the same material electrolyte filaments (paragraph 0045).

With regard to Claims 12-14, Huang et al. discloses wherein the inherently patterned paste comprises a cathode, wherein the plurality of nano-sized electrocatalytic noble metal particles are metallic components of cathode material

Art Unit: 1795

(Example 1), and wherein the cathode metallic comprise at least one of platinum, palladium, rhodium, silver, ruthenium, gold, iridium, osmium or combinations or mixtures thereof (paragraph 0030).

With regard to Claim 15, Huang et al. discloses wherein the plurality of nano-sized particles is randomly oriented throughout the paste (Figure 1).

With regard to Claims 16 and 18-19, Huang et al. discloses the plurality of ceramic ionic conducting particles have a size ranging from 100nm to 200nm (Example 1).

With regard to Claim 68, Huang et al. discloses an inherently patterned paste made up of a plurality of well-dispersed nano-sized particles of electrocatalytic noble metals and ceramic ionic conducting particles being useful in fuel cells. It is the position of the examiner that the fuel cell of Huang et al. and the instant application have the same structural features and the inherently patterned paste of electrocatalyst materials and ionic conductive material can be used in the same type of fuel cell. Applicant is advised to submit other information in regard to a single chamber fuel cell if it is shown to be patentably distinct to the invention.

With regard to Claim 69, Huang et al. discloses wherein the plurality of nano-sized particles ionic conductive particles is connected to noble metal catalytic nano-sized particles (Figure 1 and paragraph 0042).

With regard to Claim 70, Huang et al. discloses wherein the plurality of nano-sized particles is formed from a ceramic ionic conductor made from the same material electrolyte filaments (paragraph 0045) and wherein the fuel cell further comprises a



Art Unit: 1795

plurality of nano-sized electrocatalytic noble metal particles made of metallic components of cathode material (Example 1) well-dispersed and connected to the nano-sized particles formed from a ceramic ionic conductor (paragraph 0042).

***Claim Rejections - 35 USC § 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claim 72 is rejected under 35 U.S.C. 103(a) as being unpatentable over Seabaugh et al. (US 2003/0027033 A1), as applied to Claims 1-4, 6, 12-13, 15-20, 48, 49 and 68-71 above, and in further view of Monty et al. (US 6,849,911 B2).

Seabaugh et al. discloses the fuel cell in paragraph 9 above, but does not disclose wherein the liquid is a photoresist. Monty et al. discloses a method for making electrodes on which nanowires can be electrochemically grown on a substrate and a photoresist is spin-coated on the top of the substrate. The photoresist is later removed to reveal the isolated nanowires that are present on the substrate (column 3 lines 40-67 and column 4 lines 1-11). Therefore, at the time of the invention, it would have been obvious to one of ordinary skill in the art to use a photoresist as the liquid in the patterned film of Seabaugh et al., because Monty et al. teaches that using a photoresist is used to create a pattern in a substrate material (column 3 lines 58-59).

Art Unit: 1795

13. Claim 72 is rejected under 35 U.S.C. 103(a) as being unpatentable over Huang et al. (US 2002/0098406 A1), as applied to Claims 1-3, 6, 12-16, 18-20, 48, 49 and 68-71 above, and in further view of Monty et al. (US 6,849,911 B2).

Huang et al. discloses the fuel cell in paragraph 10 above, but does not disclose wherein the liquid is a photoresist. Monty et al. discloses a method for making electrodes on which nanowires can be electrochemically grown on a substrate and a photoresist is spin-coated on the top of the substrate. The photoresist is later removed to reveal the isolated nanowires that are present on the substrate (column 3 lines 40-67 and column 4 lines 1-11). Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to use a photoresist as the liquid in the patterned film of Huang et al., because Monty et al. teaches that using a photoresist helps to create a pattern in a substrate material (column 3 lines 58-59).

### ***Response to Arguments***

14. Applicant's arguments filed on July 28, 2008, have been fully considered but they are not persuasive.

*Applicant's principle arguments are:*

(a) *Applicants submit that their patterned film includes nanowires. Applicant submits that one of ordinary skill in the art would be cognizant of the fact that wires generally have one dimension (length) that is longer than another dimension (diameter). Applicant submits that this is a sharp contrast to the nanoparticles*

Art Unit: 1795

*taught by both Seabaugh et al. and Huang et al., since nanoparticles are different from nanowires in structure and in the synthesis thereof.*

*(b) Applicants respectfully disagree with the Examiner's interpretation of Seabaugh et al. In particular, the Applicants disagree with the Examiner's conclusion that the ceramic electrode is "inherently patterned", as the term "patterned" is defined by the Applicants on page 7 of Applicants' specification as filed. This process results in the patterned film recited in Applicants' independent claims 1,48 and 49; as such, the patterned film of Applicants' claims includes, in addition to the nanowires, any insoluble matter that remains after the patterning process is complete. Applicant's submit that a patterned film is not taught or even suggested by Seabaugh.*

*(c) The Applicants respectfully disagree with the Examiner's interpretation of Huang et al. In particular, the Applicants disagree with the Examiner's conclusion that the electrode is "inherently patterned", as the term "patterned" is defined by the Applicants on page 7 of Applicants' specification as filed. This process results in the patterned film recited Applicants' independent claims 1,48 and 49. As such, the patterned film of Applicants' claims includes, in addition to the nanowires, any insoluble matter that remains after the patterning process is complete. Applicants submit that such a patterned film is not taught or even suggested by Huang et al.*

Art Unit: 1795

In response to Applicant's arguments, please consider the following comments:

(a) Seabuagh et al. discloses that "nanoparticles are particles on the nano-scale or less than 100nm in dimension" (paragraph 0009). Because Seabaugh et al. discloses the nanoparticles being on the nano-scale, the disclosed nanoparticles could still be considered nanowires since the term "dimension" is used. "Dimension" encompasses "length", which would correspond to the dimensions of a nanowire. Huang et al. discloses the use of nanoparticles as well. The nanoparticles are made from the same materials as those claimed and therefore, perform the same function within the product, regardless of specific dimension. Applicant suggests that "a nanowire generally has an aspect ratio that is greater than an aspect ratio of a nanoparticle". This is not always the case, and therefore, a nanoparticle may have an aspect ratio the same as a nanowire. If Applicant feels that the aspect ratio is what sets nanowires and nanoparticles apart, perhaps an aspect ratio of the claimed "nanowire" should also be claimed.

(b) The instant claims are drawn to a product; i.e. a fuel cell. The process by which a patterned film is established on a substrate is not claimed, and is not given patentable weight because it is directed to a process and not directed to the structural features of the product. Limitations appearing in the specification but not recited in the claim are not read into the claim. See MPEP 2106. As such, Seabaugh et al. discloses the structural features of the claims and the process by which the "patterned film" is established is not given patentable weight when the end

Art Unit: 1795

product is the same as that being claimed. Therefore, Examiner upholds the conclusion that the ceramic electrode is "inherently patterned".

(c) The instant claims are drawn to a product; i.e. a fuel cell. The process by which a patterned film is established on a substrate is not claimed, and is not given patentable weight because it is directed to a process and not directed to the structural features of the product. Limitations appearing in the specification but not recited in the claim are not read into the claim. See MPEP 2106. As such, Huang et al. discloses the structural features of the claims and the process by which the "patterned film" is established is not given patentable weight when the end product is the same as that being claimed. Therefore, Examiner upholds the conclusion that the ceramic electrode is "inherently patterned".

### ***Conclusion***

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

Art Unit: 1795

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karie O'Neill whose telephone number is (571)272-8614. The examiner can normally be reached on Monday through Friday from 8am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1795

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Karie O'Neill  
Examiner  
Art Unit 1795

KAO

/Mark Ruthkosky/  
Primary Examiner, Art Unit 1795